

Trend Study 27-3-03

Study site name: Whiteman Bench.

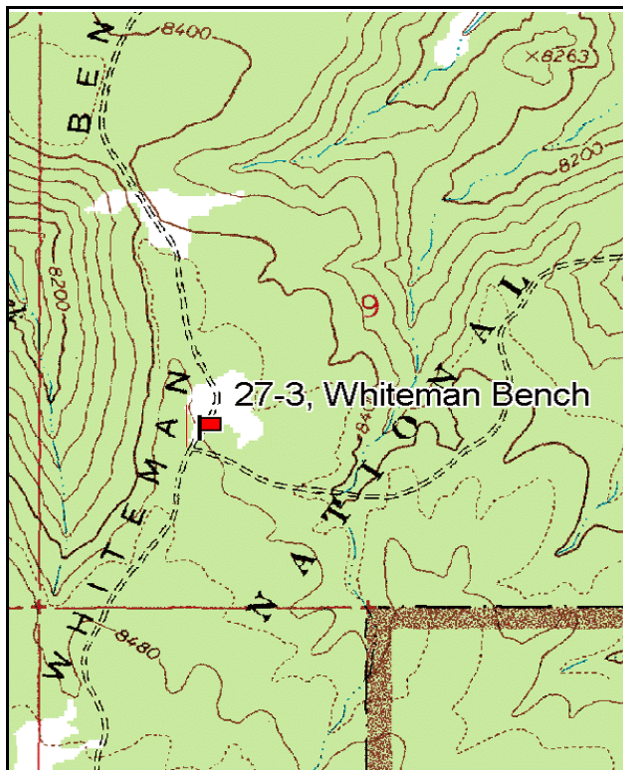
Vegetation type: Selective Logged-Ponderosa.

Compass bearing: frequency baseline 60 degrees magnetic.

Frequency belt placement: line 1 (11 & 71ft), line 2 (34ft), line 3 (59ft), line 4 (95ft). Rebar: belt 5 on 11ft.

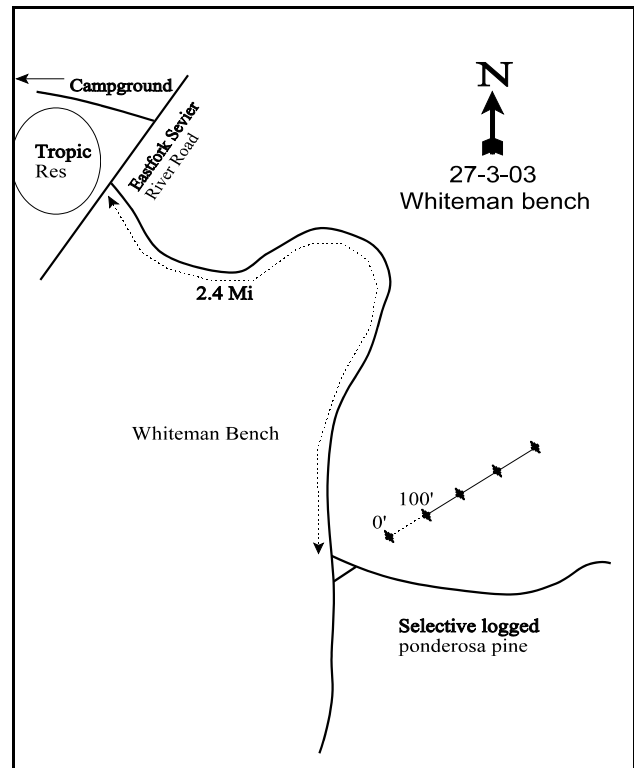
LOCATION DESCRIPTION

East of the Tropic Reservoir Dam on the E. Fork Sevier River Road, take the Whiteman Bench road east for 2.40 miles to a fork in the road. Stop here. Walk east 18 paces to the first stake, a red-painted fencepost 18" high marked with browse tag #7153. The frequency baseline runs NE from here.



Map Name: Bryce Point

Township 37S, Range 4W, Section 9



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4161825 N 391200 E

DISCUSSION

Whiteman Bench - Trend Study No. 27-3

Whiteman Bench is a large, level bench area east of Tropic Reservoir. Most of the bench is covered with ponderosa pine in varying stages of growth due to logging activities. The study samples a moderate aged stand of ponderosa that was clear cut more than 20 years ago. The understory is a mixture of shrubs and grasses. The site is nearly level with a slope of 2-3% and an elevation of 8,400 feet. The area is utilized as summer range by deer and elk. There is little livestock use occurs in the timbered areas of the East Fork allotment. Pellet group transect data collected in 2003 estimated 12 elk and 24 deer days use/acre (30 edu/ha and 60 ddu/ha) on the site. In 2003, elk pellets were from the current summer while deer pellets were older.

Due to the flat terrain, erosion is not deleterious. There was some soil movement but little net soil loss observed in 1987. In 1992, erosion was thought to have increased with vegetational pedestalling, especially in the open meadows. There is adequate litter cover associated with the trees and shrubs, especially the buildup of needles beneath the ponderosa pine. There are spots where erosion pavement and rocks are frequent on the surface. There is a high concentration of rocks 4 to 6 inches below the surface. The soil has moderate depth with an effective rooting depth estimated at 13 inches. Soil texture is a clay loam with a considerable amount of cobble rock in the profile. Soils are neutral in reactivity with a pH of 6.9. Phosphorus may be limiting to plant growth at 7.6 ppm, where 10 ppm is considered minimum for normal plant development. An erosion condition class assessment completed in 2003 resulted in a stable rating for soils.

The ponderosa canopy is fairly open, although the trees appear to have increased in size since the site was first photographed in 1981. Overhead canopy cover was estimated at 17% in 2003. The open ponderosa forest is at a relatively low density estimated at 50-60 mature trees/acre in 1997 and 2003, and appears to have little effect on the shrub understory. The most abundant and important browse species are black sagebrush, bitterbrush, and dwarf rabbitbrush. Dwarf rabbitbrush accounted for half of the total browse cover in 1997 and 37% in 2003. Density estimates for dwarf rabbitbrush have been very high ranging from about 14,000-22,000 plants/acre since 1992. These plants are very small averaging only 5 inches in height, show mostly light use, and vigor has been good in all surveys. Bitterbrush provides less than 1/4 of the total browse cover, but provides the most preferred forage. Density of bitterbrush was estimated at 720 plants/acre in 2003, a slight increase from 620 plants/acre in 1997. Seedling and young bitterbrush were few in 1997 and 2003. Percent decadence was low from 1987-1997, increasing to 39% in 2003. Bitterbrush shows moderate to heavy utilization in all surveys, but has maintained good vigor. Annual bitterbrush leaders had averaged 3 inches of growth by mid-July 2003 when the site was read.

The black sagebrush population has stabilized at around 1,400 plants/acre in 1997 and 2003. Earlier readings recorded a higher density, but poor vigor and decadence were also moderately high. This population has fairly low decadence at less than 20% in 1997 and 2003 and showed improving vigor in both years as well. Utilization of black sagebrush was light to moderate in 1992, but mostly light in all other sampling years. Annual leaders averaged 1.5 inches of growth in 2003. Other browse sampled on the site include Parry rabbitbrush, currant, snowberry, and gray horsebrush.

The herbaceous understory is not particularly abundant on this site. Grasses and forbs combined to produce 16% total cover in 1992, 8% in 1997, and 11% in 2003. The most abundant herbaceous species is by far rock goldenrod. This species provided 28% of the total herbaceous cover in 1992, increasing to 46% and 61% of the total in 1997 and 2003 respectively. Mutton bluegrass was very abundant in 1987, but has steadily declined with each sampling since. Other grasses include needle-and-thread grass, Letterman needlegrass, and *Carex*. Other forbs sampled on the site include fendler sandwort, pacific aster, and redroot eriogonum.

1992 TREND ASSESSMENT

Percent bare ground is 21%, a substantial increase since 1987. There was also more evidence of soil pedestalling around plants, especially in the meadows. This all points to a slightly downward trend for soils for this site. The browse trend is slightly up with good densities and vigor for most species. Only black sagebrush has a high rate of decadence, but biotic potential is very high at 52% and the young age class makes up 26% of the population. This should compensate for any possible losses in the future. Trend for browse is slightly up. Trend for the herbaceous understory is mixed. Sum of nested frequency of perennial grasses has declined while frequency of perennial forbs has increased. Since forbs account for 57% of the herbaceous cover, the overall herbaceous understory trend is considered stable.

TREND ASSESSMENT

soil - slightly down (2)

browse - slightly up (4)

herbaceous understory - stable (3)

1997 TREND ASSESSMENT

Trend for soil is considered slightly down. Percent bare ground cover declined slightly but vegetative cover also declined by 30%. More importantly, from a watershed standpoint, is the fact that nested frequency of perennial grasses and forbs declined by 34%. This is also shown by the ratio of protective cover to bare soil, which clearly illustrates that there is less protection for the soils at this time. Trend for browse is down slightly. The 3 key species on this site, black sagebrush, dwarf rabbitbrush, and bitterbrush, have all declined substantially in population density. However, moderate to heavy utilization of black sagebrush and dwarf rabbitbrush has declined, vigor is generally good, and percent decadence is low. Bitterbrush however, still shows similar amounts of moderate and heavy use between years. Trend for the herbaceous understory is down. Sum of nested frequency for grasses and forbs has declined substantially since 1992. The only grass species to show an increase in nested frequency since 1992 is western wheatgrass. All others declined. In addition, all forb species showed a decline in nested frequency since 1992.

TREND ASSESSMENT

soil - slightly down (2)

browse - slightly down (2)

herbaceous understory - down (1)

2003 TREND ASSESSMENT

Trend for soil is stable. Ground cover characteristics are similar to 1997 estimates, and erosion is low. Trend for browse is stable. Dwarf rabbitbrush, black sagebrush, and bitterbrush all show stable densities. Bitterbrush decadence increased to 39% and use remains moderate to heavy, but decadence for the other species is low and utilization is mostly light. As this is summer range for big game, the browse component is less important than the herbaceous understory. The herbaceous understory has a slightly downward trend as the sum of nested frequency of perennial grasses continues to decline. Perennial forbs remained stable in 2003, but are dominated by rock goldenrod which is not highly preferred for forage. The understory is likely suffering the effects of drought, but the abundance of dwarf rabbitbrush and heavy litter accumulations underneath the ponderosa pine are probably also having a negative effect on understory production.

2003 TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --
Management unit 27 , Study no: 3

T y p e	Species	Nested Frequency				Average Cover %		
		'87	'92	'97	'03	'92	'97	'03
G	Agropyron dasystachyum	a ⁻	b ³⁶	c ⁷²	b ²¹	.25	.33	.21
G	Carex spp.	57	47	35	30	.64	.74	.37
G	Koeleria cristata	12	31	26	13	.42	.22	.12
G	Oryzopsis hymenoides	b ²¹	a ³	a ⁻	a ⁻	.01	-	-
G	Poa fendleriana	c ²⁰⁹	b ¹⁴⁸	a ⁷⁵	a ⁶⁷	3.20	.93	.70
G	Poa secunda	-	-	3	-	-	.00	-
G	Sitanion hystrix	b ⁸⁷	a ³⁰	a ⁹	a ²²	.14	.05	.13
G	Stipa comata	a ¹⁹	b ⁵⁷	b ⁵³	b ⁵³	1.04	.61	.49
G	Stipa spp.	3	4	-	-	.03	-	-
G	Stipa lettermani	b ⁹³	b ⁸⁸	a ⁵¹	a ⁵⁰	.93	.50	.40
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		501	444	324	256	6.68	3.42	2.43
Total for Grasses		501	444	324	256	6.68	3.42	2.43
F	Agoseris glauca	-	2	-	7	.01	-	.07
F	Antennaria rosea	2	7	3	5	.03	.00	.01
F	Androsace septentrionalis (a)	-	a ²	a ⁻	b ¹⁷	.00	-	.03
F	Arabis demissa	10	15	11	7	.04	.02	.02
F	Arenaria fendleri	a ³³	c ⁹³	bc ⁶⁴	ab ⁴⁰	2.65	.48	.54
F	Artemisia ludoviciana	5	3	-	3	.03	-	.15
F	Arabis pulchra	-	11	-	-	.02	-	-
F	Aster chilensis	a ²⁵	b ⁷¹	a ²⁹	a ¹⁴	.51	.10	.11
F	Astragalus humistratus	b ¹¹	ab ⁶	a ⁻	a ⁻	.05	.00	-
F	Balsamorhiza hookeri	-	-	-	8	-	-	.07
F	Calochortus nuttallii	a ⁻	ab ¹	a ⁻	b ⁷	.00	-	.02
F	Cirsium spp.	-	1	1	1	.03	.03	.00
F	Crepis acuminata	-	3	4	3	.03	.01	.03
F	Cruciferae	8	-	-	-	-	-	-
F	Cryptantha spp.	-	1	-	3	.00	-	.00
F	Descurainia pinnata (a)	-	-	-	3	-	-	.00
F	Erysimum asperum	b ¹⁸	a ⁻	a ⁻	a ⁻	-	-	-
F	Erigeron flagellaris	a ⁷	b ¹⁹	a ¹	a ³	.34	.00	.00
F	Erigeron spp.	5	-	-	-	-	-	-
F	Erigeron pumilus	5	-	3	-	-	.00	-
F	Eriogonum racemosum	ab ²⁴	b ³⁸	ab ²⁹	a ¹⁷	.29	.15	.11
F	Eriogonum umbellatum	-	3	-	-	.03	-	-

Type	Species	Nested Frequency				Average Cover %		
		'87	'92	'97	'03	'92	'97	'03
F	Hymenoxys richardsonii	-	-	-	-	.03	-	-
F	Ipomopsis aggregata	6	4	5	-	.01	.01	-
F	Lappula occidentalis (a)	-	_a -	_a -	_b 16	-	-	.49
F	Lychnis drummondii	-	1	-	-	.00	-	-
F	Orthocarpus luteus (a)	_a 5	_b 21	_a 4	_a 2	.09	.01	.01
F	Penstemon caespitosus	-	7	3	-	.09	.00	.00
F	Penstemon spp.	5	6	3	3	.05	.03	.03
F	Petradoria pumila	_a 88	_{ab} 112	_a 95	_b 135	4.47	3.85	6.59
F	Phlox longifolia	_a -	_b 15	_a -	_a -	.04	-	-
F	Potentilla crinita	_a -	_b 15	_a -	_a 1	.19	-	.00
F	Polygonum douglasii (a)	_a -	_b 31	_b 29	_a 8	.07	.11	.02
F	Senecio multilobatus	-	-	-	1	-	-	.00
F	Taraxacum officinale	-	-	1	-	-	.00	-
F	Tragopogon dubius	4	-	-	-	-	-	-
F	Unknown forb-perennial	1	-	-	1	-	-	.00
Total for Annual Forbs		5	54	33	46	0.17	0.12	0.56
Total for Perennial Forbs		257	434	252	259	8.98	4.74	7.80
Total for Forbs		262	488	285	305	9.16	4.86	8.37

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 27 , Study no: 3

Type	Species	Strip Frequency			Average Cover %		
		'92	'97	'03	'92	'97	'03
B	Artemisia nova	35	32	31	2.03	1.16	1.49
B	Ceanothus fendleri	0	0	1	-	-	-
B	Chrysothamnus depressus	98	89	87	8.31	7.23	7.58
B	Chrysothamnus parryi attenuatus	36	3	33	.41	.03	.64
B	Gutierrezia sarothrae	12	1	7	.04	-	.01
B	Mahonia repens	3	0	0	.04	.00	-
B	Pinus ponderosa	6	4	4	11.14	2.20	6.71
B	Purshia tridentata	39	24	22	5.21	2.91	2.89
B	Ribes cereum inebrians	4	1	1	-	-	.15
B	Symphoricarpos oreophilus	8	9	5	.85	.81	.63
B	Tetradymia canescens	20	8	15	.24	.06	.24
Total for Browse		261	171	206	28.30	14.41	20.36

CANOPY COVER, LINE INTERCEPT --

Management unit 27 , Study no: 3

Species	Percent Cover	
	'97	'03
Artemisia nova	-	1.96
Chrysothamnus depressus	-	6.94
Chrysothamnus parryi attenuatus	-	.38
Gutierrezia sarothrae	-	.03
Pinus ponderosa	4.40	16.96
Purshia tridentata	-	3.21
Ribes cereum inebrians	-	.68
Symphoricarpos oreophilus	-	.16
Tetradymia canescens	-	.10

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 27 , Study no: 3

Species	Average leader growth (in)
	'03
Artemisia nova	1.5
Purshia tridentata	3.0

POINT-QUARTER TREE DATA --

Management unit 27 , Study no: 3

Species	Trees per Acre	Average diameter (in)
	'03	'03
Pinus ponderosa	50	9.6

BASIC COVER --

Management unit 27 , Study no: 3

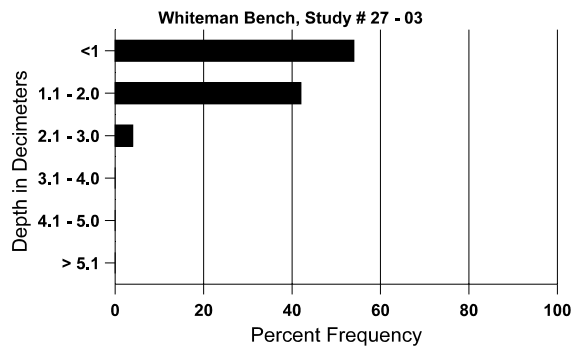
Cover Type	Average Cover %			
	'87	'92	'97	'03
Vegetation	2.00	42.34	29.83	28.45
Rock	8.75	12.57	8.37	10.07
Pavement	4.25	0	4.80	.56
Litter	75.75	49.28	47.95	51.08
Cryptogams	.25	.99	1.81	.03
Bare Ground	9.00	20.97	17.22	21.93

SOIL ANALYSIS DATA --

Management unit 27, Study no: 3, Study Name: Whiteman Bench

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
13.0	69.7 (6.0)	6.9	36.4	32.1	31.6	3.6	7.6	163.2	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 27 , Study no: 3

Type	Quadrat Frequency			Days use per acre (ha)
	'92	'97	'03	
Rabbit	6	-	3	-
Elk	3	8	9	12 (30)
Deer	6	7	7	24 (60)

BROWSE CHARACTERISTICS --

Management unit 27 , Study no: 3

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Artemisia nova</i>											
87	2399	133	300	2033	66	-	3	0	3	22	11/9
92	2020	1060	520	720	780	-	44	3	39	19	-/-
97	1380	-	140	980	260	300	0	0	19	13	13/25
03	1340	-	100	1020	220	200	1	0	16	7	14/18
<i>Ceanothus fendleri</i>											
87	433	-	200	233	-	-	0	0	-	0	4/14
92	0	-	-	-	-	-	0	0	-	0	-/-
97	0	-	-	-	-	-	0	0	-	0	10/48
03	20	-	-	20	-	-	0	0	-	0	7/24
<i>Chrysothamnus depressus</i>											
87	8199	133	800	7366	33	-	1	0	0	.81	4/7
92	21840	780	3340	16960	1540	-	15	2	7	4	-/-
97	13380	40	780	12320	280	40	.14	0	2	1	5/13
03	14980	-	420	13680	880	680	10	10	6	2	5/9
<i>Chrysothamnus parryi attenuatus</i>											
87	1132	-	166	966	-	-	0	0	0	0	6/5
92	1460	40	500	440	520	-	29	15	36	8	-/-
97	80	-	20	40	20	-	0	0	25	0	7/10
03	1220	-	40	1120	60	-	8	10	5	5	7/11
<i>Gutierrezia sarothrae</i>											
87	500	-	-	500	-	-	0	0	-	0	6/5
92	380	40	20	360	-	-	5	0	-	5	-/-
97	60	-	40	20	-	-	0	0	-	0	-/-
03	400	-	320	80	-	-	0	0	-	0	5/5
<i>Mahonia repens</i>											
87	2099	33	2033	66	-	-	0	0	-	0	5/9
92	280	140	260	20	-	-	0	0	-	0	-/-
97	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	4/5
<i>Pinus ponderosa</i>											
87	166	-	66	100	-	-	0	0	-	20	367/144
92	120	20	40	80	-	-	0	0	-	0	-/-
97	80	-	20	60	-	-	0	0	-	0	-/-
03	80	-	20	60	-	20	0	0	-	0	-/-

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Purshia tridentata											
87	1132	233	433	633	66	-	68	6	6	6	15/23
92	1820	140	820	820	180	-	38	19	10	4	-/-
97	620	40	80	440	100	-	52	6	16	0	14/41
03	720	-	20	420	280	-	36	61	39	0	16/38
Ribes cereum inebrians											
87	100	-	-	100	-	-	0	0	0	0	26/29
92	160	20	100	40	20	-	75	0	13	0	-/-
97	20	-	-	20	-	-	0	0	0	0	39/57
03	20	-	-	20	-	-	100	0	0	0	45/58
Symphoricarpos oreophilus											
87	100	-	-	100	-	-	0	100	0	0	15/20
92	300	20	160	120	20	-	13	40	7	0	-/-
97	240	-	60	180	-	-	8	0	0	0	17/41
03	300	-	60	240	-	-	33	27	0	0	13/25
Tetradymia canescens											
87	66	-	33	33	-	-	0	0	0	50	8/6
92	540	20	240	180	120	-	22	4	22	0	-/-
97	200	-	60	140	-	-	0	0	0	0	7/8
03	420	-	80	340	-	-	0	0	0	0	9/11